

IBM FlashSystem 9500 | Data sheet

Highlights

- Accelerate mission-critical applications with IBM FlashCore technology
 - Enhance cyber resilience without compromising application performance
 - Leverage IBM Spectrum® Virtualize for high-performance hybrid cloud
 - Transform data economics using data reduction with no performance impacts
 - Simplify storage management by extending powerful data services
 - Leverage artificial intelligence (AI) to optimize storage management
 - Deploy leading-edge storage solutions with confidence using IBM FlashWatch
 - Increase cost-efficiency with IBM Storage Utility programs
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NVMe-optimized high-performance storage redefines cyber resilience for the modern cloud enterprise

Often, applications exist that are foundational to the operations and success of an enterprise. These applications may function as prime revenue generators, they may guide or control important tasks, or they may provide crucial business intelligence, among many other jobs. Whatever their purpose, they are mission-critical to the organization. They demand the highest levels of performance, functionality, security, and availability. And they must be protected against the modern scourge, cyber attacks. To support mission-critical applications, enterprises of all types and sizes turn to [IBM FlashSystem® 9500](#).

IBM FlashSystem 9500 combines the performance of flash and a Non-Volatile Memory Express (NVMe)-optimized architecture with the reliability and innovation of IBM FlashCore® technology and the rich feature set and high availability of IBM Spectrum Virtualize. This powerful new storage platform provides:

- The option to use large capacity IBM FlashCore modules (FCM) with inline-hardware compression, data protection, and innovative flash management features; industry standard NVMe drives; or Storage Class Memory (SCM) drives.
- The software-defined storage functionality of IBM Spectrum Virtualize with a full range of industry-leading data services such as dynamic tiering, snapshot management, IBM Safeguarded Copy and IBM Cyber Vault, data mobility, and high-performance data encryption, among many others.

- Innovative data reduction pool (DRP) technology that includes deduplication and hardware-accelerated compression technology, plus SCSI UNMAP support and all the thin provisioning, copy management, and efficiency you'd expect from IBM Spectrum Virtualize-based storage.



IBM FlashSystem 9500

Performance and flexibility at the core

IBM FlashSystem 9500 provides petabytes of effective data storage in a very efficient four-rack-unit chassis. It utilizes IBM FlashCore technology packaged into a 2.5-inch solid-state drive (SSD) form factor and using an NVMe interface. These FlashCore Modules (FCMs) deliver powerful inline, hardware-accelerated compression technology without performance impact, consistent microsecond latency and extreme reliability.

The IBM FlashCore technology has enabled very high flash density and storage capacity. New third generation FCMs deliver enhanced compression technology enabling up to 116TB to be stored in a single drive. In addition, FCM 3 has full hot-swap capabilities and supports FIPS 140-3 Level 1 encryption with IBM Security Key Lifecycle Manager and Gemalto SafeNet KeySecure centralized key management.

The IBM FlashCore Modules can be complemented with Storage Class Memory (SCM) NVMe drive technology. SCM technology offers even lower latency and when combined with FCM drives, can be used for even more demanding workloads.

IBM FlashSystem expands its support of the NVMe fast-access protocol with NVMe-over fabrics to compatible hosts for complete end-to-end NVMe support. Combined with the NVMe capabilities of the systems, they can achieve latency as low as 50 microseconds to accelerate

application performance and business productivity.

Flexibility is built into the IBM FlashSystem architecture. You can choose FCMs in multiple capacities, industry-standard NVMe drives or SCM drives to deliver the capacity you need with the performance you require. The IBM FlashSystem 9500 has the capability to support all these drive types simultaneously within the array. This means that using the always-on inline high-performance data compression in the FCMs or DRP technology with the industry-standard drives, effective capacities of a single 4U IBM FlashSystem 9500 can range up to 4.5 petabytes and deliver performance of 100 GB/s throughput or 1.6 million IOPS with a database-like workload.

IBM FlashSystem 9500 features dual controllers, dual power supplies, and redundant cooling. Each of the two controllers has two 2.4GHz Intel Ice Lake CPUs with 24 cores. Up to 1.5TB of memory can be configured per controller, so that in a single 4U storage system you can leverage the performance and efficiency of three terabytes of memory and multiple petabytes of storage, all moving at NVMe speeds, to tackle even the most demanding real-time analytics or AI application workloads. IBM FlashSystem 9500 supports host attachment using 16/32 Gbps fibre channel, and 10/25 Gbps and 100 Gbps Ethernet with iSCSI and NVMe RDMA options.

Simplified management

IBM FlashSystem 9500 with IBM Spectrum Virtualize is designed to simplify hybrid cloud storage environments from the very start. The systems utilize a modern user interface for centralized management. With this single interface, administrators can perform configuration, management, and service tasks in a consistent manner over multiple storage systems – even from different vendors – vastly simplifying management and helping reduce the risk of errors. Plug-ins to support VMware vCenter help enable more efficient, consolidated management while a REST API and Ansible support help enable automated operations. The interface is consistent with other members of the IBM Spectrum Storage family, to simplify tasks for administrators and help reduce the risk of error.

Powerful cloud and container capabilities

IBM Spectrum Virtualize provides the data services foundation for every IBM FlashSystem 9500 solution. Its industry-leading capabilities include a wide range of data services that can be extended to over 500 IBM and non-IBM heterogeneous storage systems; automated data movement; synchronous and asynchronous copy services (either on-premises or to the public cloud); encryption; high-availability configurations; storage tiering; and data reduction technologies, among many others. IBM FlashSystem 9500 solutions can function as IT infrastructure modernization and transformation engines, thanks to the IBM Spectrum Virtualize capabilities that allow you to extend a wide range of data services and functionality to more than

500 legacy external heterogeneous storage systems under the solution's management, reducing both capital and operational costs while increasing the return on your investments in legacy infrastructure.

The IBM Spectrum Virtualize technology within IBM FlashSystem 9500 arrays offers powerful data-reduction pool capabilities that include block deduplication that works to minimize the number of data copies stored, and hardware-accelerated data compression technology that provides consistent, high-performance results across application workload patterns. IBM FlashSystem 9500 DRP supports the SCSI UNMAP command, which allows software to tell the storage system when it's no longer using portions of storage. This capacity is then returned to the pool to be used to satisfy other requirements. Previously, storage would stay assigned even if it was no longer being used, which wastes capacity.

To further drive your IT transformation, combining IBM FlashSystem 9500 with [IBM Spectrum Virtualize for Public Cloud](#) offers multiple ways to create hybrid cloud solutions between on-premises private clouds and the public cloud. The common platform brings consistency to enable real-time storage-based data replication and disaster recovery, as well as data migration between local storage and IBM Cloud, Amazon Web Services (AWS) or Microsoft Azure. And thanks to its software-defined storage nature, IBM Spectrum Virtualize allows storage administration at a cloud service provider's site in the same way as on-premises, regardless of the type of storage.

Virtualization and container support

The IBM Spectrum Virtualize functionality in IBM FlashSystem 9500 complements server virtualization technologies such as PowerVM, Microsoft Hyper-V, VMware vSphere, Kubernetes, and Docker. Similar to provisioning virtualized servers, provisioning capacity with IBM FlashSystem 9500 is designed to become an almost entirely automated function.

Containers are an open-source technology that wraps applications with everything needed to run in any environment. Containerization is a key enabling technology for flexibly delivering workloads to private and public cloud and DevOps. IBM FlashSystem 9500 supports Red Hat OpenShift and Kubernetes container environments, accelerating the deployment of persistent volumes with the IBM block storage CSI driver, certified by Red Hat and IBM.

Rock solid data resilience

As systems became linked with external networks, organizations adopted a "defense-in-depth" security mode so that if the perimeter was breached, there were additional layers of security to protect critical information. IBM FlashSystem 9500 provides advanced capabilities that can help maximize data protection, security, and high availability to significantly reduce the risk of

disruption and financial losses due to user errors, malicious destruction, or ransomware attacks. FlashSystem 9500 delivers the capability to enable this level of protection while also delivering high performance for applications.

With Safeguarded Copy, IBM adds a line of defense against cyber threats by protecting your valued data from cyberattacks with immutable and isolated copies that are hidden, non-addressable and cannot be altered. In the event of an attack, these copies can be quickly restored to support recovery. Customized to your particular application mix, IBM FlashSystem Cyber Vault builds on IBM Safeguarded Copy to help reduce cyber attack recovery times.

Cyber Vault runs continuously and monitors snapshots as they are created automatically by Safeguarded Copy. Using standard database tools and automation software, Cyber Vault checks Safeguarded Copy snapshots for corruption. If Cyber Vault finds such changes, that is an immediate sign an attack may be occurring.

When preparing a response, knowing the last snapshots with no evidence of an attack speeds determining which snapshot to use. And since Safeguarded Copy snapshots are on the same FlashSystem storage as operational data, recovery is very fast using the same snapshot technology. With these advantages, FlashSystem Cyber Vault is designed to help reduce cyberattack recovery time from days to just hours.

In addition, physical isolation layers can also be created by storing sensitive copies in immutable storage, cloud environments or off-line write-once read many (WORM) tape devices to provide physical air-gap protection.

IBM FlashSystem 9500 includes improved serviceability with more hot-swappable components, secure boot capability that helps ensure only IBM-signed software can run on the system, and multi factor authentication when administrators log into the system to help validate their identity.

Moving data is one of the most common causes of planned downtime. The IBM Spectrum Virtualize technology within IBM FlashSystem 9500 enables data movement from one storage system to another, or between arrays, while maintaining access to the data. This function can be used when replacing older storage with newer storage, as part of load-balancing work, or when moving data in a tiered storage infrastructure from disk drives to flash.

IBM HyperSwap® function supports storage and servers in two or three data centers. In this configuration, IBM FlashSystem solutions enable servers at each data center to access data concurrently, with automated switch-over in case of failure, when it is implemented by IBM Lab Services, IBM can guarantee 100% availability. When combined with server data mobility functions such as VMware vMotion or IBM PowerVM Live Partition Mobility, HyperSwap technology enables non-disruptive storage and virtual machine mobility between data centers that can be up to 300 km (186 miles) apart.

And with more organizations looking to adopt data resilience solutions that go beyond simple data backup and recovery, the [IBM Spectrum Protect](#) portfolio is the perfect complement for IBM FlashSystem. It provides unified end-to-end workload protection, both on-premises and in the cloud, including applications, VMs, file systems, SaaS workloads, AWS EC2 instances, and containers.

Advanced replication

The IBM Spectrum Virtualize functionality in IBM FlashSystem 9500 is designed to enable administrators to apply across all systems under management a single set of advanced network-based replication services that operate in a consistent manner, regardless of the type of storage being used.

When used with other IBM FlashSystem 9500 products, volumes can be replicated across 3 sites, offering both high availability and data recovery using synchronous and asynchronous data communication.

IBM FlashCopy functionality is designed to create an almost-instant copy (or “snapshot”) of active data that can be used for backup purposes or for parallel processing activities. Up to 256 copies of data may be created.

IBM Spectrum Protect is designed to perform near-instant application-aware snapshot backups using FlashCopy local replication, but with minimal impact to IBM DB2, Oracle, SAP, VMware, Microsoft SQL Server, or Microsoft Exchange databases.

IBM FlashSystem 9500 also supports remote mirroring, enabling organizations to create copies of data at remote locations for disaster recovery. Replication can occur between any systems built with IBM Spectrum Virtualize and can involve any supported storage, including cloud. Support for VMware vCenter Site Recovery Manager helps speed disaster recovery.

For IP replication, IBM Spectrum Virtualize uses innovative Bridgeworks WANrockIT technology to optimize the use of network bandwidth and can compress data being transmitted to help reduce networking costs and improve remote replica currency.

Cost-efficiency

IBM FlashSystem 9500 offers better performance and a consolidated tiered storage environment, in which you need less space, reducing your footprint, maintenance expenses and other operating costs. With the high density of FCM drives, the automated tiering and the data reduction options within IBM Spectrum Virtualize help transform the economics of data storage.

The innovative data reduction options allow compression, deduplication and thin provisioning to significantly improve usable capacity and efficiency allowing you to store more in less space. With automated storage tiering with Easy Tier® can help improve performance and lower costs by enabling the more efficient use of flash storage or multiple tiers of drives. Easy Tier automatically identifies more active data and moves that data to faster storage such as Storage Class Memory and FlashCore Modules. This helps organizations leverage flash storage for the data that can benefit the most.

In addition to built-in cost-efficiency features, IBM FlashSystem 9500 capacity can be procured using the [IBM Storage Utility](#) pricing model. This offering allows you to predict monthly data capacity costs and only pay for the capacity you need, whether your data grows or shrinks. No need to over-purchase or lease large amounts of capacity for “just in case” needs. Simply use the data that your business needs and the IBM Storage Utility offering will take care of the rest.

AI-powered storage visibility, insight, and control

[IBM Storage Insights](#) and Storage Insights Pro provide critical system analysis and optimization capabilities that enhance your IBM FlashSystem experience, such as:

- A single dashboard so you can see the status of all your block storage at a glance
- System information gathered from approximately 23 million data points so you can make better, more informed decisions
- Monitoring of Brocade and Cisco switches and fabrics to help identify saturation, congestion, and fabric errors that might impact your storage performance
- AI-enhanced analytics that leverage knowledge from over two exabytes of storage currently under management to better predict and help prevent problems before they impact your business
- When support is needed, the ability to easily open a ticket, upload log information, and view open tickets
- Detailed configuration data available to IBM specialists to help close tickets quickly.

Delivered as a service from IBM Cloud at no charge, Storage Insights is quick and easy to set up and requires no ongoing software maintenance. IBM Storage Insights Pro is an upgrade that provides more detailed information and additional capabilities.

Deploy with confidence

To enhance the IBM FlashSystem 9500 acquisition, deployment, and operational experience, IBM offers a suite of programs collectively called **IBM FlashWatch**. This suite of programs includes high availability, data reduction, and flash endurance guarantees; all-inclusive licensing; Storage Expert Care and cloud-based analytics; cloud-like utility pricing; storage upgrade options; and free data migration for the first 90 days. IBM FlashWatch increases confidence in purchasing, owning, and upgrading IBM Storage solutions.

IBM Storage Expert Care Advanced and Premium service and support are available. Simply select the level of support and term of service to support your business needs.

Storage made simple for hybrid cloud

IBM FlashSystem 9500 solutions provide a single enterprise class platform to address the full spectrum of 21st-century data storage requirements. From NVMe-powered all-flash performance and IBM FlashCore reliability, through easy hybrid cloud integration and almost unlimited scalability, to data services that can transform and modernize existing systems, IBM FlashSystem 9500 is designed to simplify storage and accelerate business productivity.

IBM FlashSystem 9500 at a glance

Models	<ul style="list-style-type: none"> • Control enclosures 4666-AH8, UH8 • Expansion enclosures AFF, A9F
Clustering	IBM FlashSystem 9500 systems can cluster for high availability HyperSwap configurations as well as for scale out.
Software	<ul style="list-style-type: none"> • IBM Spectrum Virtualize • IBM Storage Insights
Host Interface	Hot swappable. Ports per control enclosure: <ul style="list-style-type: none"> • Up to 48 x 16/32 Gbps Fibre Channel (FC, NVMeoF) • Up to 20 x 10/25 Gbps Ethernet (iSCSI and NVMe RDMA) • Up to 12 x 100 Gbps Ethernet (iSCSI and NVMe RDMA)
User Interface	GUI, CLI, REST API

Maximum drives supported	<ul style="list-style-type: none"> • 48 NVMe drives per control enclosure • 24 2.5" SAS drives per AFF expansion enclosure • 92 2.5" SAS drives per A9F expansion enclosure • Up to a maximum of 184 SAS drives in expansion enclosures per control enclosure
Supported NVMe drives	<p>FlashCore Modules</p> <ul style="list-style-type: none"> • 4.8 TB, 9.6 TB, 19.2 TB and 38.4 TB with hardware compression <p>Storage Class Memory (SCM)</p> <ul style="list-style-type: none"> • 1.6 TB <p>Industry-standard NVMe</p> <ul style="list-style-type: none"> • 1.92 TB, 3.84 TB, 7.68 TB, 15.36 TB, and 30.72 TB
Supported SAS drives	<p>2.5-Inch SAS SSD</p> <p>1.92 TB, 3.84 TB, 7.68 TB, 15.36 TB and 30.72 TB</p>
RAID levels	DRAID 1 and 6 with dynamic DRAID expansion
Max IOPS (4K read hit)	8 million
Minimum latency (4K read hit)	<50 µs
Maximum IOPS (4K read miss)	2.5 million
Maximum bandwidth (256KB read miss)	100 GB/s
Core per control enclosure	Four 24-core 2.4GHz Intel Ice Lake processors per control enclosure
Cache per control enclosure	From 1024 GB up to 3,072 GB per control enclosure
Fans and Power Supplies	Fully redundant, Hot Swappable
Rack Support	Standard 19-Inch
Advanced features	<ul style="list-style-type: none"> • Data reduction via thin provisioning, UNMAP, Compression and deduplication • Data-at-rest AES-XTS 256 encryption • Easy Tier • Data migration • External virtualization • Safeguarded Copy
Replication features	<ul style="list-style-type: none"> • Snapshots • Hyperswap (high availability) • 2- and 3- site replication with synchronous and asynchronous options
Additional available advanced features	<ul style="list-style-type: none"> • IBM FlashSystem Cyber Vault • IBM Storage Insights Pro • IBM Spectrum Virtualize for Public Cloud • IBM Spectrum Control • IBM Spectrum Protect • IBM Spectrum Protect Plus

<p>Warranty and Support</p>	<p>IBM FlashSystem 9500 (machine type 9846) hardware warranty:</p> <ul style="list-style-type: none"> • IBM installation • One year standard warranty • IBM On-Site Repair: 24x7; Same Day Software Maintenance <ul style="list-style-type: none"> • IBM Storage Expert Care Advanced: <ul style="list-style-type: none"> ◦ Available in 1-5 years ◦ IBM On-Site Repair: 24x7; Same Day Software Maintenance ◦ IBM Storage Expert Care Services: <ul style="list-style-type: none"> ■ Guidance on installation, usage, and configuration ■ Automated ticket management and alerting ■ Predictive support ■ IBM Storage Insights entitlement • IBM Storage Expert Care Premium: <ul style="list-style-type: none"> ◦ Available in 1-5 years ◦ IBM On-Site Repair: 24x7; Same Day Software Maintenance ◦ IBM Storage Expert Care Services: <ul style="list-style-type: none"> ■ Guidance on installation, usage, and configuration ■ Automated ticket management and alerting ■ Predictive support ■ Storage Insights Pro entitlement ■ Remote code upgrades (two per year) ■ Technical Account Manager ■ 30 minutes response on severity 1 or 2 issue
<p>Dimensions</p>	<p>Control enclosures</p> <ul style="list-style-type: none"> • Height: 17.43 cm (6.8 in.) • Width: 44.6 cm (17.6 in.) • Depth: 82.6 cm (32.6 in.)
<p>Weight</p>	<p>Fully configured FlashSystem 9500 control enclosure (48 drive modules installed): 70.5 kg (155.5 lb)</p>
<p>Supported systems</p>	<p>For a list of currently supported servers, operating systems, host bus adapters, clustering applications and SAN switches and directors, refer to the IBM System Storage Interoperation Center: https://www.ibm.com/systems/support/storage/ssic/interoperability.wss</p>
<p>Independent software vendor (ISV) solutions</p>	<p>For a list of high-quality solutions with our partner ISVs, including access to solution briefs and white papers, refer to the ISV Solutions Resource Library: https://www.ibm.com/partnerworld/wps/pub/systems/whyibm/programs</p>

Why IBM?

IBM offers a vast portfolio of hardware, software and services to help organizations cost-effectively address their IT infrastructure needs. These include robust data-storage solutions to enable always-on, trustworthy storage and recovery from disaster. Because business needs shift, IBM solutions emphasize interoperability and the integration of new use cases or approaches, from analytics to multi-site backup to near-instant recovery. With IBM, organizations can create flexible, robust and resilient storage infrastructure to support critical operations for smooth operations and regulatory compliance.

Powerful all-flash block storage solutions that provide affordable, high-performance enterprise-grade functionality for businesses of all sizes. Unique IBM FlashCore Modules provide unparalleled density, endurance, and performance. Built with IBM Spectrum Virtualize and the AI-powered storage management and proactive support of IBM Storage Insights, FlashSystem delivers consistent rich data services across on-premises, hybrid cloud, containerized or virtualized environments.

For more information

Visit our [solutions page](#) to learn more about the FlashSystem family of data systems, or contact your IBM representative or IBM Business Partner. If you need to be connected, [fill out this form](#) to schedule a consult with an IBM storage expert.

Additionally, IBM Global Financing provides numerous payment options to help you acquire the technology you need to grow your business. We provide full lifecycle management of IT products and services, from acquisition to disposition. Visit: <https://www.ibm.com/financing/flash>

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